



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,212	07/01/2003	Gregory G. Freeman	FIS920030098US1	1211
23550	7590	04/28/2005	EXAMINER	
HOFFMAN WARNICK & D'ALESSANDRO, LLC			ECKERT II, GEORGE C	
3 E-COMM SQUARE			ART UNIT	
ALBANY, NY 12207			PAPER NUMBER	

2815

DATE MAILED: 04/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/604,212

Applicant(s)

FREEMAN ET. AL.

Examiner

George C. Eckert II

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 10-14 and 31-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11, 12, 14 and 31-35 is/are rejected.
- 7) ☒ Claim(s) 6, 10, 13 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendment dated March 21, 2005 in which claims 1 and 12 were amended, claims 7-9 and 15-30 canceled and claims 31-36 newly added has been entered.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 11, 12, 14 and 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by 5,798,561 to Sato. Sato teaches in figures 5-9 a self-aligned bipolar transistor comprising:

a raised extrinsic base including:

an outer region 34/36;

an inner extension region 38 extending laterally inward from the outer region toward an emitter 39, the inner extension region horizontally non-overlapping the outer region; and

an intrinsic base 37/35 positioned below the raised extrinsic base, the intrinsic base being separated from the outer region by a dielectric layer 32 positioned above the intrinsic base.

Regarding claim 2, Sato teaches that the dielectric layer 32 which separates the intrinsic base and the outer region specifically separates the outer region 34/36 from the intrinsic base outer region (the outward lateral edge of region 35). Regarding claims 3, 4, 33 and 34, Sato teaches that the inner extension region 38 defines an opening into which the emitter is self-

Art Unit: 2815

aligned and that a spacer 14 is formed between the inner extension region and the emitter (see figs. 6J-L). Regarding claim 11, Sato teaches that the outer region 34/36 is doped p<sup>+</sup> (high concentration, col. 13, lines 23 and 39) while the inner region 38 is doped p (lower concentration, col. 13, line 45).

Regarding claims 12, 31 and 32, Sato teaches in figure 9 that both the inner region 38 and the outer region 36 contact the intrinsic base at separate locations, the locations separated by a separation portion (fig. 9 shows both 38 and 36 contacting 37, note that 36 is formed having an “L” shape and that the horizontal leg of the L contacts intrinsic base 37 while the vertical leg provides a separation portion between the horizontal leg and the location where the inner region 38 contacts the intrinsic base) and that the outer base intrinsic region is over a shallow trench isolation 4 in that it is located in a higher plane. Regarding claim 14, Sato teaches that the outer region includes polysilicon (col. 13, line 23) and the inner region also includes polysilicon (col. 13, line 45 and see col. 14, lines 11-12 indicating that SiGe is actually Ge doped Si).

3. Claims 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by 5,962,880 to Oda et al. Oda teaches in figure 1 a self aligned BJT comprising:

- a raised extrinsic base including:

- an outer region 10;

- an inner extension region 11 extending laterally inward from the outer region toward an emitter 14/15, the inner extension region horizontally non-overlapping the outer region; and

- an intrinsic base 9 positioned below the raised extrinsic base;

wherein the outer region 10 and the inner extension region 11 each contact the intrinsic base and the outer region 10 also contacts an intrinsic base outer region (at the far edge of the intrinsic base) that is positioned over a shallow trench isolation 4 (the intrinsic base outer region is at a higher plane than isolation 4 and thus over it) and below the outer region.

Regarding claim 32, Oda teaches that the outer region 10 contacts the intrinsic base at a first location separated from a second location where the inner extension region 11 contacts the intrinsic base (10 and 11 are separated by 12 and thus contact the intrinsic base at separate locations). Regarding claim 33, Oda teaches that the inner extension region 11 defines an opening into which the emitter is self-aligned (note figure 8B showing the emitter 14/15 formed in the layer 11 such that 11 and 14 are aligned). Regarding claim 34, Oda teaches that a spacer 13 is formed between the inner extension 11 and the emitter 14.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over '561 to Sato. Sato taught the device of claim 1 as discussed above but did not expressly teach that the emitter width was less than 0.1 microns. Sato did teach that the purpose of the invention is to reduce the contact area between the intrinsic base and collector (see fig. 5, the distances S1 and S2 and see col. 7, lines 26-30). Because the emitter is only a fraction of the intrinsic base width,

Art Unit: 2815

it is considered obvious to form the emitter having a width of 0.1 microns. The motivation for doing so is taught by Sato in that a smaller intrinsic base to collector contact area results in a faster device (col. 3, lines 7-13). Moreover, it is well known in the art that making a region smaller, here the emitter region smaller, allows for a smaller overall device and thus more devices may be incorporated into a single circuit which increases density. It is considered obvious to form the device of Sato having an emitter width of 0.1 microns.

#### *Allowable Subject Matter*

5. Claims 6, 10, 13 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### *Response to Arguments*

6. Applicant's arguments filed March 21, 2005 have been fully considered but they are not persuasive. Regarding the rejection over Sato, applicant argues on page 7 that Sato fails to anticipate because a bottom portion of Sato's raised extrinsic base is below the top of intrinsic base 37 and thus "intrinsic base 37 is not below the alleged outer region of the extrinsic base." (*emphasis in original*). This is not persuasive. While it is agreed that a portion of the extrinsic base is below the intrinsic base, this does not defeat the rejection. Neither the label "raised extrinsic base" nor the limitation "positioned below the raised extrinsic base" requires that no part of the extrinsic base be below the top of the intrinsic base. For example, as shown in the prior art figure 1 of the instant application, a "raised extrinsic base" transistor is described (spec.

Art Unit: 2815

para. 0005). It is clearly seen in figure 1 that a portion of extrinsic base 12 is below the top of the intrinsic base region 20. Furthermore, a reasonable interpretation of the claim language does not exclude a portion of the extrinsic base from being below the top of the intrinsic region, especially when the majority of the extrinsic base is formed above the intrinsic base.

Applicant also argues that Sato fails to anticipate claim 12, which now cites that the contact locations are separated by a separation portion. However, as explained in the above rejection, this limitation does not distinguish over Sato. Again, the outer region 36 is formed having an “L” shape such that the low leg of the “L” is the first contact location which is separated by the upper or vertical leg of the “L” from the second contact location where inner region 38 contacts intrinsic base 37. As there is no limitation as to what forms the “separation portion” this is a reasonable interpretation. In all the arguments are not persuasive.

Applicant argues the rejection of claim 1 over Oda et al. That rejection is withdrawn. However, Oda is applied against new claims 31-34. Applicant points out in the response on pages 6-8 that the rejection cited element 10 *and* element 12 of Oda as teaching the “outer region” and one must be wrong. Since the rejection of claim 1 is withdrawn, the point is essentially moot. However, as the above rejection of claim 31 states, it is region 10 that is considered the outer region. Lastly, applicant argues that claim 31 is allowable since Oda’s layer 5 is not an intrinsic base that is positioned below the outer region. This argument is not understood since layer 5 was not cited as either an intrinsic or extrinsic base. Rather, element 10 was cited as the outer region contacting the intrinsic base outer region that is positioned over a shallow isolation region. In all, the arguments as to Oda are not persuasive.

*Conclusion*


7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax number is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**